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### 3.2 Quality Assurance Review

#### 3.2.1 Organic Data: Lab Case 5778

##### 3.2.1.1 Introduction

The findings offered in this report are based upon a general review of all available data. Blank results, surrogate and matrix spike recoveries, calibration standards, target compound matching quality, tentatively identified compounds, and quantitative calculations were examined in detail.

##### 3.2.1.2 Qualifiers

It is recommended that this data package be utilized only with the following qualifier statements:

- o The presence of the following compounds is qualitatively questionable.

<u>Compounds</u>	<u>Samples with Questionable Results</u>
methylene chloride	All samples with positive results
acetone	All samples with positive results
toluene	All samples with positive results
bis(2-ethylhexyl) phthalate	CE001, CE003, CE009, and CE020

The aforementioned compounds cannot be assumed present, based upon this analysis, as data contain evidence to doubt their presence. (They may or may not be present.) Generally, these data are best used to demonstrate that substantially greater levels of environmental contamination do not exist in the above sample results.

- o The following compounds (all polyaromatic hydrocarbons) were added to the data summary:

<u>Compounds</u>	<u>Samples</u>
acenaphthalene	CE002
anthracene	CE004
acenaphthene	CE006 and CE016
naphthalene	CE006
benzo(a)anthracene	CE004, CE011, and CE266
chrysene	CE004, CE011, CE018, and CE266
pyrene	CE012
phenanthrene	CE012
dibenzo(a,h)anthracene	CE006
benzo(b & k)fluoranthene	CE010, CE019, CE018, and CE266
benzo(a)pyrene	CE018 and CE266

- o The concentration of 2-methylnaphthalene in sample CE016 should be considered estimated.
- o Reported concentrations of methylene chloride and acetone should be considered estimated for all solid samples analyzed.
- o Detection limits for some base/neutral fraction compounds may be higher than reported for samples CE001 and CE009.
- o N-nitrosodiphenylamine in sample CE011 should be considered suspected unreliable.

#### 3.2.1.3 Findings

- o Field and/or laboratory blanks revealed the presence of methylene chloride, acetone, toluene, and bis(2-ethylhexyl) phthalate at sufficient levels to question the aforementioned sample results.

- o Following the examination of spectra provided by the laboratory, the aforementioned polyaromatic hydrocarbons (PAHs) were added to the data summary. Although some background interferences were present and the concentrations were at low levels, characteristic ions and patterns were present. This indicates that these compounds are confidently present and, as such, have been added to the data summary.
- o A high percent difference (PD) was observed for the response factor of 2-methylnaphthalene between the initial calibration standard and the standard associated with sample CE016. As a result, the reported concentration of 2-methylnaphthalene in this sample should be considered estimated (may be different).
- o High PDs were observed for the response factors of acetone and methylene chloride between the initial calibration standard and the two continuing calibration standards associated with solid sample VOA analysis. Consequently, all reported concentrations of these compounds should be considered estimated.
- o Due to low surrogate recoveries for D<sub>5</sub>-nitrobenzene in sample CE001 and D<sub>14</sub>-terphenyl in sample CE009, detection limits may be higher than reported for some base/neutral compounds in these two samples. However, it is not possible to determine to what extent this affects the data.
- o N-nitrosodiphenylamine is a common contaminant observed in other blanks analyzed by the laboratory which analyzed sample CE011. As a result, even though N-nitrosodiphenylamine was not detected in any blanks in this data package, it should be considered as suspected unreliable.
- o Tentatively identified compounds which are not documented contaminants/artifacts are presented following this Quality Assurance Review.

#### 3.2.1.4 Summary

This Quality Assurance Review has identified unreported PAHs and blank contamination as the primary areas of concern. It should be noted that this organic case was analyzed by two laboratories (one for solids and one for water(s)). Consequently, two appendices, containing the documentation of the problems encountered, are provided.

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### 3.2.2 Inorganic Data: Lab Case 5778

#### 3.2.2.1 Introduction

The findings offered in this report are based upon a general review of all sample data, including blank analysis results, matrix spike results, duplicate analysis results, laboratory control standards, calibration standards, and ICP interference check standards.

#### 3.2.2.2 Qualifiers

It is recommended that this data package be utilized only with the following qualifier statements:

- o The qualitative presence of the following elements is questionable:

<u>Elements</u>	<u>Samples with Questionable Results</u>
aluminum	MCC941, MCC943, and MCC960
barium	MCC941, MCC943, and MCC948
chromium	All aqueous samples and MCC944
copper	MCC960
iron	MCC941, MCC943, MCC947, and MCC948
lead	MCC945, MCC950, MCC951, MCC952, MCC953, MCC957, MCC958, MCC959, and MCC961
manganese	MCC941, MCC943, and MCC948
nickel	All samples with positive results
potassium	All samples with positive results
silver	All samples with positive results
sodium	All solid samples, except MCC957, MCC950, and MCC959
vanadium	MCC941, MCC943, MCC944, MCC945, MCC947, MCC948, MCC949, MCC957, and MCC960
zinc	MCC941, MCC943, and MCC948



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The aforementioned elements cannot be assumed present, based upon this analysis, as data contain evidence to doubt their presence. (They may or may not be present.) Generally, these data are best used to demonstrate that substantially greater levels of environmental contamination do not exist in the above sample results.

- o Detection limits and/or positive values may be higher than reported for the following elements in all solid samples: antimony, arsenic, manganese, mercury, and selenium. In addition, detection limits for arsenic in aqueous samples may also be higher than reported.
- o Detection limits for thallium in the following samples may be higher than reported: MCC944, MCC950, MCC952, and MCC959.
- o Reported concentrations of calcium in all solid samples should be considered estimated (may be different). In addition, positive results reported for barium in the five soil samples should also be considered estimated.
- o Reported concentrations of lead in samples MCC952 and MCC953 should be considered estimated (may be different).
- o Mercury was added to the data summary for sample MCC942 at 0.3 mg/kg.

#### 3.2.2.3 Findings

- o Field and/or laboratory blanks revealed the presence of aluminum, barium, chromium, copper, iron, lead, manganese, nickel, potassium, silver, sodium, vanadium, and zinc at levels sufficient to question the aforementioned sample results.

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- o Due to poor matrix spike recoveries, detection limits may be higher than reported in solid samples for the following elements: antimony, arsenic, manganese, mercury, and selenium. In addition, any positive results reported for these metals may actually be higher. In the case of arsenic and manganese, high relative percent differences (RPD) were observed in the field duplicate analysis which adds to the uncertainty associated with these metals. As a result of poor matrix spike recoveries in the aqueous matrix spike sample (MCC948), detection limits for arsenic may be higher than reported for all aqueous samples analyzed.
- o As a result of poor post digestion spike recoveries (less than 60 percent), observed for samples MCC944, MCC950, MCC952, and MCC959, detection limits may be higher than reported for thallium.
- o A high RPD was observed for calcium in the duplicate analysis of MCC942; consequently, reported concentrations of this mineral in any sediment sample should be considered estimated. In addition, high RPDs were observed for both barium and calcium in the field duplicate analysis of sample MCC950 (soil no. 1). As a result, concentrations for the five soil samples should be considered estimated.
- o As a result of a correlation coefficient of less than 0.995 for lead in the method of standard additions analysis for MCC952 and MCC953, the reported concentrations of lead in these two samples should be considered estimated.
- o As the result of the apparent omission of a mercury result for sample MCC942, a value of 0.3 mg/kg has been added to the data summary.

3.2.2.4 Summary

The attached Quality Assurance Review has identified blank contamination and spike recoveries as the primary areas of concern. Please see the appendix for documentation of these and other problems encountered.

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SECTION 4

#### 4.0 TOXICOLOGICAL EVALUATION

##### 4.1 Summary

A small area on the Damascus Tanning site is the alleged burial place for a quantity of anthrax-infested hides and mercuric chloride wastes. Anthrax is a highly infectious disease of grazing animals that can be transmitted to humans via dermal, inhalation, or oral exposure. Current conditions (the burial area is covered and vegetated) do not indicate a serious health problem; however, any excavation in the burial area may increase the potential for exposure to this harmful bacteria, if present.

A soil sample taken near the suspected burial area revealed notable levels of mercury and chromium, both of which were used during the hide treatment processes. These metals may be of some concern if present in their more toxic states, methylmercury and hexavalent chromium. Impacts on the local environment due to mercury and chromium cannot be determined with available information.

On-site samples also revealed notable levels of polycyclic aromatic hydrocarbons (PAHs) and cyanide, as well as low levels of pentachlorophenol (PCP) and 1,1,1-trichloroethane (1,1,1-TCEA). No serious impacts on human health or the environment are anticipated due to these contaminants.

A sample from the (b) (6) home well showed a level of the volatile organic compound and suspect human carcinogen tetrachloroethene (PCE: 19 ug/l) that exceeds its Maximum Contaminant Level (MCL) Goal (MCLG). While no noncarcinogenic effects are expected, lifetime exposure to the reported PCE levels via ingestion and inhalation (PCE volatilized into the air as a result of showering, laundering, etc.) may result in an additional cancer risk in excess of  $2.8 \times 10^{-5}$ . PCE was not detected in any of the other on- or off-site samples.

A sample from the (b) (6) well showed manganese above its recommended Secondary MCL (SMCL) and sodium above its suggested drinking water guidance level. The general public would experience no adverse effects subsequent to consumption of these contaminants.

## 4.2 Support Data

### 4.2.1 Environmental Samples

Anthrax-infested hides and mercuric chloride wastes, both of which were allegedly buried on site, may present a public health concern in some cases. Anthrax, a highly infectious disease mainly in grazing animals such as cows and sheep, can be directly or indirectly transmitted from the animals or their products (meats, hides, etc.) to humans. Direct contact with materials containing anthrax endospores can cause a malignant pustule where the organism enters the skin through a cut or abrasion. The most serious form of anthrax is pulmonary anthrax, which occurs when the endospores are inhaled or swallowed. This condition results in Woolsorter's disease, a dangerous type of pneumonia. Anthrax is more deadly to animals than humans and immunization has been successful. Second attacks are uncommon in animals as well as humans.<sup>1,2</sup>

Although the anthrax-causing bacteria can usually be found in most soils throughout the United States, there are only a few human anthrax cases reported in the United States each year. In other parts of the world, notably Asia and South America, anthrax in animals is still a problem and, according to available information, Damascus Tannery imported its hides from China and South America from 1915 through the 1930s. While it is not known when the contaminated hides may have been buried, studies have shown that anthrax spores can survive up to 60 years in soils.<sup>1,2,3</sup> Anthrax does not appear to pose a significant health threat at the present time, since current site conditions (the burial area is covered and vegetated) do not indicate any likely exposure routes. Any excavation in the alleged burial area, however, may increase the possibility of exposure to the anthrax spores, if present.



Mercuric chloride was used during the hide disinfection process on site, and low levels of mercury were detected in many of the on-site soil samples. The highest concentration (12 mg/kg), which is somewhat higher than the upper range soil level of 3.4 mg/kg, was reported in soil no. 4, taken from the area closest to the suspected mercuric chloride/animal hide burial location.<sup>4</sup> The possibility of microbial alteration of the mercuric chloride (if present in the burial area) catalyzed by the rotting animal hides may exist. Mercury in soils can be methylated by microorganisms to form toxic methylmercury, which tends to adsorb to organic elements in soils, rendering it relatively immobile. A portion of the methylmercury, if present, would also volatilize over time.<sup>5,6</sup> Therefore, it seems improbable that a notable amount of methylmercury, if present on site, will impact local groundwater or surface water.

In addition to mercury, soil no. 4 also showed 1,163 mg/kg chromium. Although this level only slightly exceeds the upper range soil level for chromium of 1,000 mg/kg, it is notable since the species of chromium is not known.<sup>4</sup> Hexavalent chromium (Cr6) is highly toxic and mobile in soil, while trivalent chromium (Cr3) is an essential nutrient and rather immobile.<sup>6</sup> In the presence of organic soil components, most Cr6 is converted to Cr3; however, the potential for Cr6 to infiltrate local groundwater may exist. Impacts on groundwater near the site cannot be definitively determined with available information.

The concentrations of several PAHs reported in the downstream sediment (20,500 ug/kg), the trench sediment (9,400 ug/kg), and the pond stream sediment (24,200 ug/kg) are typical of PAH levels found in urban roadsides (these results are on a wet-weight basis and perhaps may be two to three times higher on a dry-weight basis).<sup>7</sup> PAHs exhibit a strong affinity for soil/sediment elements and are, therefore, immobile and largely unavailable for absorption following skin contact with low part-per-million levels. PAH exposure can result in a host of dermal toxic effects, in addition to some carcinogenic risk.<sup>7</sup> Prolonged or repeated direct exposure to the downstream, trench, and pond sediments are improbable and may be considered inadvisable.

An aqueous and a sediment spring sample revealed PCP (90 ug/l) and 1,1,1-TCEA (70 ug/kg), respectively. PCP is used as a bacteriocide and may be absorbed through the skin.<sup>8</sup> It is relatively nonvolatile and immobile, although it may move through soil to a slight degree.<sup>6</sup> The reported level is below the proposed MCLG of 220 ug/l and the Acceptable Intake/Chronic (AIC) of 1,050 ug/l.<sup>9,10</sup> No human health effects are expected. PCP is not persistent in surface water, although it may adsorb to sediment particulates.<sup>5</sup> PCP is only moderately bioconcentrated (BCF=770) and its biodegradation products are bioconcentrated to a greater extent.<sup>5</sup> Note that PCP was not detected in the two well samples or any of the other on- and off-site samples.

1,1,1-TCEA is highly volatile and mobile in soils; however, upon entering the atmosphere, it is rapidly photooxidized.<sup>5</sup> The reported, isolated level of this contaminant is not expected to migrate to a significant degree.

Another contaminant, cyanide, was detected in the aqueous trench sample at a level (37 ug/l) that exceeds the chronic Ambient Water Quality Criterion (AWQC) of 5.2 ug/l.<sup>11</sup> This area of standing water is not intended to support aquatic life; the AWQC is given for comparative purposes only. Due to the limited routes of exposure and the fact that cyanide does not tend to persist at low levels in the environment, no adverse effects on human health or the environment are anticipated.

#### 4.2.2 Well Samples

Organic analysis of the two domestic wells revealed 19 ug/l PCE in the (b) (6) well. Note that this volatile organic compound was not detected in any of the other on- or off-site samples and that the source of this contamination cannot be ascertained with available information. The reported PCE level exceeds the proposed MCLG of 0 ug/l.<sup>12</sup> An MCLG is a nonenforceable health goal set at a level that will result in no known or anticipated adverse health effects with an adequate margin of safety. No enforceable MCL has been promulgated for PCE.



The MCLG of 0 ug/l has been suggested due to PCE's classification as an EPA Group B2 suspect human carcinogen (sufficient evidence of carcinogenicity in animals, but inadequate evidence in humans). Lifetime consumption of two liters per day of water from the (b) (6) well may result in an excess cancer risk of about  $2.8 \times 10^{-5}$ .<sup>10</sup> An additional cancer risk may be incurred due to inhalation of PCE entering the atmosphere as a result of showering, laundering, washing dishes, etc.<sup>13</sup> Oral and inhalation exposure to the reported PCE concentration is not expected to pose any noncarcinogenic concerns (the Adjusted Acceptable Daily Intake of PCE is 85 ug/l).<sup>14</sup>

The sample from the (b) (6) well revealed levels of manganese (50 ug/l) and sodium (43,350 ug/l) above recommended criteria. Manganese exceeds its SMCL of 50 ug/l, which is recommended to protect against objectionable aesthetic properties.<sup>15</sup> SMCLs are not toxicity-based criteria. The reported sodium level is in excess of the suggested drinking water guidance level of 20,000 ug/l.<sup>9</sup> The reported sodium concentration should not pose any toxic threats to the general public but would contribute a greater proportion of total daily intake of sodium and may be considered significant by those persons on a low-sodium diet.

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LIST OF SOURCES

1. Tortora, G.J., B.R. Funke, and C.L. Case. 1982. Microbiology - an Introduction. The Benjamin/Cummings Publishing Company, Incorporated. Menlo Park, California.
2. Acker, Lorie, United States EPA Region 3, and Arnold Kaufman, Centers for Disease Control. Telecon. March 4, 1986.
3. Greené, James, Pennsylvania Department of Environmental Resources, and Ralph Johnson, Former Employee of Damascus Tanning. Correspondence. Undated.
4. Shacklette, H.T., and J.G. Boerngen. 1984. Element Concentrations in Soil and Other Surficial Materials of the Conterminous United States. United States Geological Survey Professional Paper 1270.
5. Versar, Incorporated for United States Environmental Protection Agency. 1979. Water-Related Environmental Fate of 129 Priority Pollutants. Monitoring and Data Support Division, Washington, D.C. 440/4-79-029.
6. Clement Associated, Incorporated for the United States Environmental Protection Agency. 1985. Chemical, Physical, and Biological Properties of Compounds Present at Hazardous Waste Sites. Final Report.
7. United States Environmental Protection Agency. 1980. Ambient Water Quality Criteria for Polynuclear Aromatic Hydrocarbons. Office of Water Regulations and Standards, Washington, D.C. EPA 440/5-80-069.
8. Windholz, M., et al. 1983. The Merck Index. 10th Edition. The Merck Company, Incorporated. Rahway, New Jersey.

9. Federal Register. 1985. National Primary Drinking Water Regulations; Synthetic Organic Chemicals, Inorganic Chemicals and Microorganisms; Proposed Rule. Vol. 50, No. 219. November 13, 1985.
10. United States Environmental Protection Agency. 1987. Updated Reference Dose and Cancer Potency Numbers for Use in Risk Assessments. Memorandum. Office of Solid Waste and Emergency Response, Toxics Integration Branch, Washington, D.C.
11. United States Environmental Protection Agency. 1986. Quality Criteria for Water. Office of Water Regulations and Standards. Washington, D.C. EPA 44-/5-86-001.
12. Federal Register. 1985. National Primary Drinking Water Regulations; Volatile Synthetic Organic Chemicals; Final Rule and Proposed Rule. Vol. 50, No. 219. Wednesday, November 13, 1985.
13. Symms, K.G. 1986. Household exposure from contaminated water supplies. Presented at the American Society of Civil Engineers, Annual Convention and Geotech 4 Conference. Boston, Massachusetts. October 1986.
14. Federal Register. 1984. National Primary Drinking Water Regulations; Volatile Synthetic Organic Chemicals; Proposed Rulemaking. Vol. 49, No. 114. Tuesday June 12, 1984.
15. United States Environmental Protection Agency. 1979. National Secondary Drinking Water Regulations. Office of Drinking Water, Washington, D.C. EPA-570/9-76-000.